EVALUATING THE OPERATION OF OPEN RECLAMATION NETWORKS OF BUKHARA REGION AND JUSTIFYING THE SCIENTIFIC EFFICIENCY OF IMPROVEMENT

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ABSTRACT

On the example of improving the functioning of melioration networks of Karaulbazar district of Bukhara region-Improving the melioration of irrigated lands in the area and increasing crop yields, increasing the productivity of existing melioration networks. New innovative ideas will be developed in this area. In practice, mechanisms for their table are provided. According to long-term observations, the average annual groundwater level in the irrigated areas of the Karaulbazar district is 3.08 m-3.17 m. The hydro-chemical regime of groundwater is also applied to irrigated areas when analyzing the location of the groundwater table in the characteristic period of location, after vegetation 3.17 m before April 1, 2.98 m on July 1 and 3.08 m after October 1. That is continuously related to the amount and mineral composition of the wastewater supplied and its location. The chemical composition of groundwater is much more complex and consists of concentrations of large amounts of harmful mineral salts. The advantages of closed drainages are also described.

Key words: *irrigation sources, underground water, temperature; water consumption regime, water balance, precipitation, evaporation, closed drainage, drainage modules.*

ANNOTATSIYA

Buxoro viloyati Qoraulbozor tumani meliorativ tarmoqlari faoliyatini takomillashtirish misolida - hududdagi sug'oriladigan yerlarning meliorativ holatini yaxshilash va ekinlarning hosildorligini oshirish, mavjud meliorativ tarmoqlarining samaradorligini oshirish. Ushbu yo'nalishda yangi innovatsion g'oyalar ishlab *chiqilgan. Uzoq yillik kuzatuvlarga ko'ra, Qorovulbozor tumanining sug'oriladigan maydonlarida yer osti suvlarining o'rtacha yillik joylashgan sathi 3,08 m-3,17 m. Shuningdek, yer osti suvlarining gidrokimyoviy rejimi sug'oriladigan maydonlarga 1-aprelda 3,17 m, 1-iyulda 2,98 m va 1-oktabrdan keyin 3,08 m joylashgani ko'rish mumkin. Yetkazib beriladigan zovur suvlarning miqdori va mineral tarkibi uning joylashuvi bilan doimiy bog'liqdir. Yer osti suvlarining kimyoviy tarkibi ancha murakkab va ko'p miqdordagi zararli mineral tuzlarning kontsentratsiyasidan iborat bo'lish. Shuningdek, yopiq zovurlarning afzalliklari bayon etilgan.*

***Kalit so'zlar**: sug'orish manbalari, yer osti suvlari harorati, suv iste'mol qilish rejimi, suv balansi, yog'ingarchilik, bug'lanish, yopiq zovur, zovur moduli.*

АННОТАЦИЯ

Примером совершенствования мелиоративной сети Караулбозорского района Бухарской области является улучшение мелиорации орошаемых земель в регионе и повышение урожайности сельскохозяйственных культур, повышение эффективности существующих мелиоративных сетей. В этом направлении были разработаны новые инновационные идеи. По данным многолетних наблюдений, среднегодовой уровень грунтовых вод на орошаемых площадях Каравулбозорского района составляет 3,08-3,17 м3. Также видно, что гидрохимический режим подземных вод составляет 3,17 м 1 апреля, 2,98 м 1 июля и 3,08 м после 1 октября. Количество и минерализация подаваемой дренажной воды постоянно зависит от ее местоположения. Химический состав подземных вод намного сложнее и состоит из скоплений большого количества вредных минеральных солей. Также описаны преимущества закрытых дренажных систем.

***Ключевые слова**: источники орошения, температура подземных вод, режим водопотребления, водный баланс, осадки, испарение, закрытый дренаж, дренажные модули.*

INTRODUCTION

Today, about 2.0 million hectares (46.7%) of the 4.3 million hectares of irrigated land in the country are saline to varying degrees. In particular, 1 million 324 thousand hectares (30.9%) are low, 570 thousand hectares (13.3%) are medium and 105.5 thousand hectares (2.5%) are strongly saline. Improving the productivity of irrigated lands, improving melioration and water supply Large-scale irrigation and land melioration measures are being implemented within the framework of state programs. 140,000 km of collector-drainage networks, 3475 vertical drainage wells, 301 melioration pumping stations and 24839 melioration monitoring wells serve to improve the melioration of these irrigated lands and keep the groundwater level at a normal level. As a result, from 2008 to 2017, the water supply of more than 1.7 million hectares of irrigated land and the melioration of 2.5 million hectares were improved. However, as a result of global climate change, periodic water shortages in recent years and the failure of the main part of domestic irrigation and drainage networks have led to the deterioration of the melioration of irrigated lands and their decommissioning over the years. Therefore, on November 27, 2017, "the years 2018-2019 the development of irrigation and irrigated land melioration program" the President of the Republic of Uzbekistan No. PP-3405 President's decision [1-4].

The role of drainage varies between the different agroclimatic zones. In the temperate zone, mainly located in the northern hemisphere, the role of drainage is to prevent waterlogging by removing excess surface and subsurface water resulting from excess rainfall. In the arid and semi-arid zone, the role of drainage is to prevent irrigation-induced waterlogging and salinity, not only by removing excess surface and subsurface water but also by removing soluble salt brought in by the irrigation water. In the humid and semi-humid zone, the role of drainage is to prevent waterlogging and salinization to various degrees. About 64% of the drainage is located in the temperate zone, 24% in the arid and semi-arid zone and 12% in the humid and semi-humid zone [6-8].

The purpose of the study: Improving the operation of collector-drainage networks in order to improve the reclamation of irrigated lands of Karaubazar district of Bukhara region.

Scientific novelty of the research:

1. Scientific and theoretical substantiation of the existing collector-drains in the "Dustlik" massive of Karaulbazar district of Bukhara region.
2. Feasibility study of collector-ditches.
3. The land use coefficient (EFC) increased from 0.91 to 0.94.
4. The average yield of cotton has increased by 8-10%.

Results obtained and their analysis. **Groundwater regime.** Factors influencing the melioration of irrigated lands are mainly the location of groundwater levels and their hydro-chemical regime. It is known that the regime of groundwater in irrigated areas depends mainly on the amount of water taken to the boundary of the area and the amount of drainage water discharged from the border. The inflow of groundwater to the border and the amount of groundwater leaving also affect the area. According to long-term observations, the average annual groundwater level in the irrigated areas of the Karaulbazar district is 3.08 m - 3.17 m. The hydro-chemical regime of groundwater is also applied to irrigated areas when analyzing the location of the groundwater table in the characteristic period of location, after vegetation 3.17 m before April 1, 2.98 m on July 1 and 3.08 m after October 1. That is continuously related to the amount and mineral composition of the wastewater supplied and its location. The chemical composition of groundwater is much more complex and consists of concentrations of large amounts of harmful mineral salts [20].

The hydro-chemical regime is studied in groundwater by examining water samples taken from observation wells three times a year. Irrigated areas can be divided into several types based on the natural drainage properties, geomorphological structure and groundwater movement of groundwater in terms of mineral content and chemical composition of groundwater:

1. Renewable hydro-chemical regime (on pre-irrigated lands).
2. Irreversible hydro-chemical regime:
   a) on pre-irrigated lands;
   b) b) in newly irrigated areas.

In irrigated areas, the hydro-chemical regime of groundwater varies mainly in accordance with the amount and composition of water to be irrigated, as well as the amount and composition of drainage water discharged through drainages. Their amount increases during the summer growing season and decreases after the winter saline washing season, and this situation is observed to change within the same limits over the next many years.

Compile the general water balance equation of the irrigated area and determine the drainage load

The total water balance of artificially irrigated areas is expressed in A.N Kostyakov's general water balance equation as follows:

$$\Delta W = A + B + \overline{П} + \underline{П} - (И + T_p) - \overline{O} - \underline{O} - C \pm P - Д \qquad (1)$$

Here:

A - the amount of atmospheric precipitation, mm or m3/ha;

B - the amount of water taken into the irrigation system, m3/ha;

$\overline{П}, \underline{П}$	inflow of surface and groundwater;

$(И+T_p)$ water evaporated into the air over the soil and with the help of plantsamount, mm or m3/ha;

$\overline{O}, \underline{O}$	surface and groundwater runoff;

C - the amount of irrigation water flowing out of the equilibrium area;

±P - inflow and outflow of pressurized groundwater into groundwater,m3/h

Д - the amount of water that falls into the drainage, m3/ha;

From the above equilibrium equation to the drainageit is possible to determine the amount of load falling.

For certain conditions, the medium is for multi-year reporting

ΩW =0 and the components in equation (1) can be condensed.

Equilibrium is the surface and ground that flows and flows into the field groundwater ($П$, $\underline{П}$ and $О$,$\underline{О}$) Improved irrigation, as the amount is zerowhen the technique is used, C = 0. In this case, the amount of water (Д) entering the drainage from Equation (1) is determined as follows:

The scheme of the equilibrium area and the elements that make up the water equation equation are given in the following diagram.

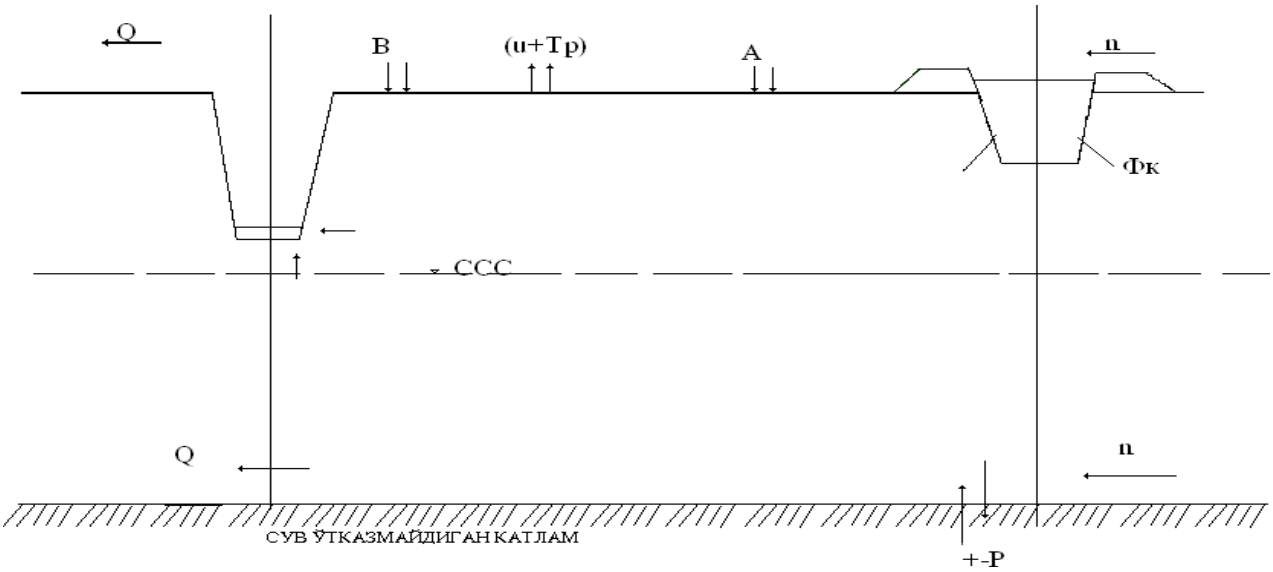


Figure 2. Equilibrium scheme of the field.

Determining the elements of the water balance equation.

Determination of the elements of the water balance equation.1.

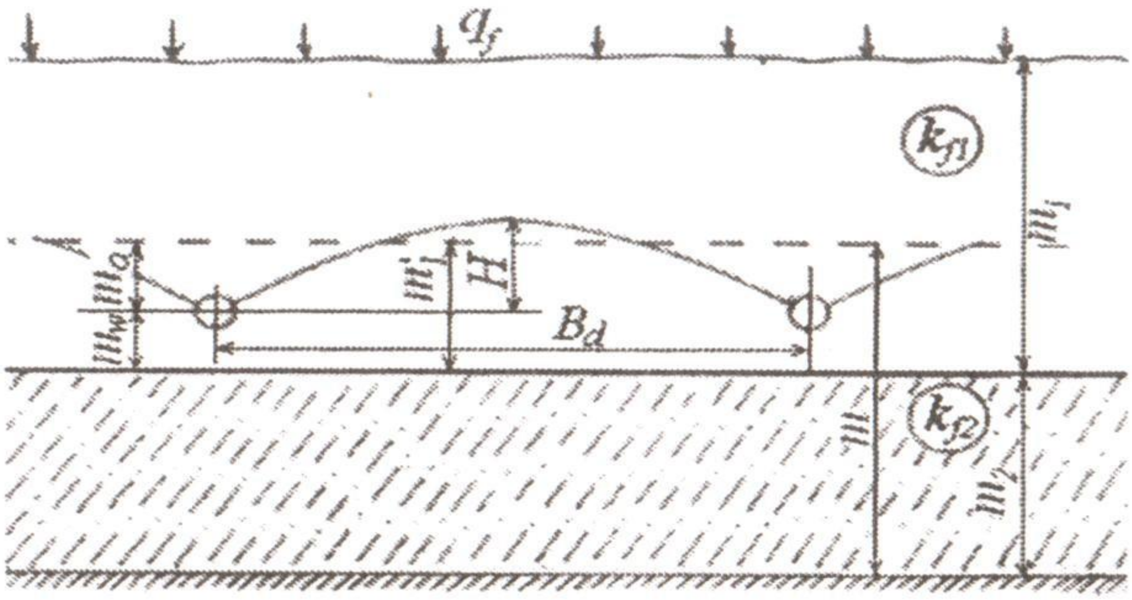
Determine the amount of fire.We take this value for the reporting period based on the data of the meteorological center in the center of the district where the farm is located (Table 1.2.1).

A_{veg}=14mm=140 m^3/ha A_{year}=113mm=113 m^3/ha

1. The amount of water taken into the irrigation network.

$B=M_c+Ф_к$ - for vegetation period;

$B=M_c+Ф_к+M_{ш.ю}$ - for the year.



B_{year}=5099+695,3+3420=9214,3 m^3/ha

2. Two-component filtration scheme.

m_1 4,5m	K_1 0,11m/*day*	T_1 0,48m^2 / *day*
m_2 15m	K_2 1,05m/*day*	T_2 15,4m^2 / *day*

In accordance with the reclamation and hydrogeological conditions of the farm soil, we design the drainage drainagees to increase the concentration and land use coefficient.The pipe size used in closed trenches is required to be d> 50mm, slope *i*> 0.003, water velocity V> 0.2m / day, calculated section length L≥600.The depth of penetration of closed drainagees (drainage) is determined by the following formula.

$$H_{dr}=H_{d.n}+h_{min}+h_0, \quad m \quad (11).$$

Here:

$H_{d.n}$ - drying rate is adopted depending on the mechanical composition of the soil and the total width (drainage reclamation in agriculture, Table 2.5, p. 33);

H_{min} - the constant minimum pressure value between the two drains, depending on the mechanical composition of the soil layer to be drained, can be assumed to be h_{min} = 0.8 m for medium soils (drainage reclamation in agriculture, p. 78);

h_0- depth of water in the drainage, m.

H_0 = 0.1 m for adjusting drainage networks,m H_{dr}=2,3+0,8+0,1=3,2 m

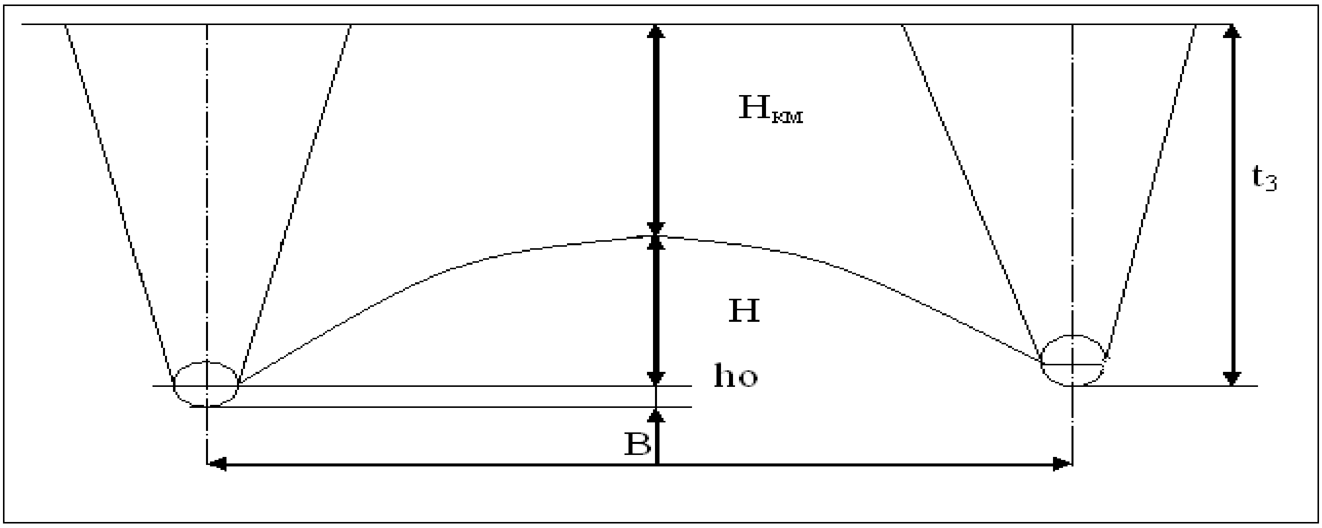


Figure 3.5.1.2. Scheme for determining the depth of bed drainage.

The distance between the closed drains is determined using the formula V.M. Shestakov.

Next, we examine the need to design temporary (temporary) drainagees on the farm.The flow of filtered water based on the saline wash rate, saline wash cycle and drainage parameters determined as a result of the above calculationsremoval rate with constant renderingVdrsaline wash cyclecompare with the required velocity (*V*) of the filtered water flow.

Types of drainagees and placement of drainagees in the economic plan.

Drainage systems can be of the open or open type. The choice of the type of drainage depends on the technical and economic efficiency, the efficient use of agricultural machinery, the area under the canals, the required slope and thedepending on the outflow of water by its own flow.The location of the control drains in the farm plan shall be located in connection with the temporary drainagees and the municipal canal, and their design calculated length shall be close to the actual relative length. The actual relative length is determined as follows.

This means that during the saline wash, the water supplied to the brine wash is ensured to be removed through permanent drainage and there is no need to build a temporary drain.

Collectors can be open or open round. The higher the calculated water consumption, the more it is possible to design them in the open round. Collectors pass through ravines, in areas with high salinity, across the economic boundary. Drains are carried out in the economic plan in the direction of a large slope of the land, parallel to the canals and drainagees, in an upright position, and between the permanent irrigation networks. The cross-section of open-type drainage networks can be trapezoidal, polygonal and parabola. Cross-section elements include the drainage base, width, width of the slope, width of the berm. Drains are often designed in a round shape. Gravel-sand mixtures with a diameter of 0.10-0.15 mm are used as a filter.Drainage pipes will be made of ceramic, polymer, asbestos cement and concrete. The filter plug protects the pipes from mud and dirt particles entering the pipe.

Control wells will be constructed to check the operation of the closed drain and to clear the pipes of mud. The control well is installed at the head of the drain and every 200-400 m along its axis.A drainage facility will be constructed at the junction of an open collector with a closed drain.When the slope of the drainage area is small, the control drainage network along the direction of the slope is placed according to the longitudinal scheme.Drainage networks are placed in the middle of permanent irrigation networks. If the drainage network is located in the direction of the irrigation network and side by side, then the irrigation network should be equipped with a special coating against water wastage.The network is designed to be waterproof only. The closest distance (*l*) between the irrigation network and the drainage network is determined as follows[9-20].

Determination of estimated water consumption of drainage networks.

The estimated water consumption of the drainage network is determined as follows.

$$Q = W^{total} \cdot q \qquad (15)$$

here:

W^{total} - gross area covered by a drainage, ha;

q_3 - drainage module, l / s ha.

Based on the layout of drainage networks in the economic plan, we determine their estimated water consumption:

CONCLUSION

In conditions of water scarcity, the water-salt regime of saline, prone to salinization soils with the help of deep (h=3-4,5) drainagees does not improve. Construction of drainagees with a depth of 2-2,5 m, creation of a semi-hydromorphic wetting regime in the soil layer, irrigation of cultivated plants, maintenance of optimal water-salt regime in the root zone as a result of formation of "fresh" water reserves in the upper part of groundwater high quality products can be obtained. According to the observations and analyzes conducted in different soil-reclamation areas of irrigated agriculture, as the depth of groundwater increases, the rate of seasonal irrigation of cotton and other crops will increase.

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